

**REMARKS**

Entry of the foregoing and reconsideration of the subject application are respectfully requested in light of the amendments above and the comments which follow.

Claims 2-23 were pending in this application. In this response, claim 23 has been amended to correct a typographical error. Thus, claims 2-23 remain pending.

Support for the foregoing amendments can be found, for example, in at least the following locations in the original disclosure: the original claims and the specification, page 4, lines 31-32.

Entry of the foregoing is appropriate pursuant to 37 C.F.R. § 1.116 for at least the following reasons. The amendments raise no new issues that would necessitate further search and/or substantive reexamination and presents claims that, in conjunction with the following remarks, are allowable.

***REJECTIONS UNDER 35 U.S.C. § 103***

Claims 2 to 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent Application No. 2001-49399 (hereafter “*JP-399*”) alone or in view of U.S. Patent No. 5,714,114 to Uehara (hereafter “*Uehara*”) for the reasons presented at page 2 of the Official Action. Reconsideration of this rejection is respectfully requested.

Applicants have previously highlighted at least one difference between the present claims and the disclosure in the cited references. Namely, the claimed range for Cu of less than 0.1 wt-% does not overlap with the disclosed range in *JP-399* of 0.1-3.0 wt-% (see, Abstract and page 3

of the USPTO provided translation) or the disclosed range in *Uehara* of not less than 0.1 to 2.0 wt-% (see, col. 6, lines 50-51).

In response to this prior argument, the Examiner states that the disclosed amount of Cu closely approximates the claimed amount (para. 4 of the Official Action), and thus the Examiner alleges that one of ordinary skill in the art would have expected the same properties. However, based on the knowledge of one of ordinary skill in the art at the time of the invention, which is knowledge gained from *Uehara* and *JP-399*, one of ordinary skill in the art would not have expected the same properties for Cu content below 0.1 wt-% as it would have for Cu content above 0.1 wt-%. *Uehara* (who is also the inventor in *JP-399*) clearly teaches away from any modification of the Cu content to below 0.1 wt-%.

For example, *Uehara* discloses a narrow range for Cu because of the deleterious effects of both too little and too much Cu. *Uehara* explains that “Cu is an element which is very effective in greatly increasing pitting corrosion resistance when added in a small amount in the steel containing Cr, Mo and N. If Cu is less than 0.1%, a sufficient effect can not be obtained. But if Cu is added in excess of 2.0%, not only hot workability is deteriorated, but also a sufficient degree of hardness can not be obtained after quenching” (col. 6, lines 43-49). Furthermore, *Uehara* discloses that “it is desired to contain Cu as much as possible. But if the Cu content is too large, there would arise a problem of deteriorating hot workability” (col. 2, lines 60-62).

Thus, *Uehara* is very specific that one of ordinary skill must avoid Cu below 0.1 wt-%, which is the amount of copper claimed in the present claims. In addition, there is no rational basis to one of ordinary skill to have Cu below 0.1 wt-% in view of the express teaching away in *Uehara*. As such, there is no basis for a modification to reduce the amount of Cu in *JP-399* to

include the amount claimed by Applicants (*see, KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. \_\_\_, (2007); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also, Aventis Pharma Deutschland GmbH V. Lupin Ltd.*, 499 F.3d 1293 (Fed. Cir. 2007) and there can be no such articulated reason in view of the express teaching in *JP-399* and *Uehara* to have higher Cu content and to avoid Cu less than 0.1 wt-%.

Unexpectedly, Applicants discovered that by forming a steel alloy containing a specific combination of Cr, Mo, and N, the alloy possesses an increased pitting corrosion resistance without the need of Cu content above 0.1wt-% as required in *Uehara* and *JP-399* (see, page 2, line 29 – page 3, line 6 of the Specification). Additionally, in contrast to *Uehara*, the present specification teaches, for example, that in order to avoid deterioration in the hot working properties of the alloy, the copper content must be kept below 0.1 % by weight (see, page 5, lines 21-26). This feature is present in the currently claimed alloy composition.

The Official Action requests comparative testing to show unexpected results. Applicants respectfully assert that no such comparative testing is required in this case. The express teachings in the cited references demonstrate that one of ordinary skill in the art (as represented by those references) understood to avoid Cu less than 0.1 wt-% due to deleterious effects. However, Applicants have successfully utilized copper below 0.1 % by weight while avoiding such deleterious effects. No further objective evidence of unexpected results should be required and the Examiner is respectfully asked to reconsider these disclosures in view of the present comments.

In addition to the above, *Uehara* and *JP-399* each at least fail to disclose “a value for  $PRE > 25$ , wherein  $PRE = \%Cr + 3.3 * \%Mo + 16 * \%N$ ” in combination with concentrations within the ranges recited in claim 17. Although it is true that the broad ranges of Cr, Mo, and N

disclosed in *Uehara* or *JP-399* include concentrations that could theoretically meet the PRE value claimed, both references also disclose concentrations that would not meet the PRE value claimed. Also, the alloys in, e.g., Table 1 of *JP-399*, that do have PRE values  $> 25$  also have concentrations of constituent elements outside of the claimed ranges in Claim 17. Therefore, to meet the PRE value claimed, one of ordinary skill in the art would have to pick and choose from the ranges for the particular constituent values that would create a PRE value greater than 25 while also meeting the compositional limits as claimed. However, without recognizing the PRE value as a result-effective variable, one of ordinary skill in the art would have no reason to optimize the concentrations to arrive at the claimed PRE value. Only result-effective variables can be optimized. *See* MPEP § 2144.05(II)(B).

Although it is understood that the rationale for modifying a reference can be different from Applicants' rationale, there must still be a rationale for such a modification. As explained above, *Uehara* and *JP-399* fail to recognize the advantage of a PRE value greater than 25, and thus cannot be modified for that purpose. Additionally, the optimized concentrations suggested in *Uehara* and *JP-399* result in PRE values less than 25 and/or with concentrations outside the claimed ranges. For example, in *Uehara* the described preferred ranges of Cr of between 13 and 14% (col. 6, l. 27); Mo of between 1.5 and 2.5% (col. 6, l. 43); and N of between 0.05 and 0.15% (col. 7, l. 5), when combined, contain a PRE value less than 25. Therefore, prior to the recognition by Applicant of the advantage of a PRE value greater than 25, there is no evidence to support the conclusion that one of ordinary skill in the art would have optimized the steel alloy to arrive at a PRE value greater than 25 as recited in claim 17.

Further and in regards to JP-399, alloys 1-3 in Table 1 (JP-339) have considerably higher Cu-contents ( $\text{Cu} > 15 \text{ wt}\%$ )<sup>1</sup> as well as lower Mo-contents ( $\text{Mo} < 2.5 \text{ wt}\%$ ). Mo is added in high amounts to improve the pitting corrosion. Mo is also stated to be one of the three most important alloying elements to control pitting corrosion (p. 2, lines 29-32 in the present application). Furthermore all alloys except alloy No. 8 (Table 1) have  $\text{Cr} > 15.4 \text{ wt}\%$ . It is clearly stated in the present application that the chromium content should be below 15 wt% in order to avoid formation of large primary carbides (p. 5, lines 12-18). The alloy that the Examiner points out as the one that most resembles that claimed is alloy No 8. However, although alloy No. 8 does indeed have a PRE  $> 25$  and a hardness  $> 56 \text{ HRC}$ , the composition of that alloy differs in three elements – Mo, Cu and Ti – from that claimed. Also, the Cr-content is very close to the upper limit of 15 wt%.

Overall and in view of the above, Applicants respectfully assert that a *prima facie* case of obviousness has not been established. For at least the above noted reasons, the present rejections should be reconsidered and withdrawn.

### ***CLAIM OBJECTION***

Claim 23 was objected to because of informalities. The typographical error in claim 23 is corrected. Reconsideration is respectfully requested.

### ***CONCLUSION***

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the

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<sup>1</sup> In fact, only Alloy 21 has a Cu content within that claimed.

undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

DRINKER, BIDDLE & REATH LLP

Date: May 29, 2009

By: 

Jeffrey G. Killian  
Reg. No. 50,891

**CUSTOMER NO. 055694**

**DRINKER, BIDDLE & REATH LLP**

1500 K Street, N.W., Suite 1100

Washington, D.C. 20005-1209

Tel: (202) 842-8800

F: (202) 842-8465